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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : South African Provisional Patent Application No. 2003/2302
Applicant : Bernard Lionel GIEN
Filed : March 25, 2003
Docket No. : BOTHAP-4
Customer No. : 28752
10806745

Certificate of Deposit of Mail

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Transmitted herewith is a Certified Copy of South African Provisional Specification and drawings of Patent Application 2003/2302, filed in the name of Bernard Lionel GIEN on March 25, 2003, titled "DOWN THE HOLE DRILL ASSEMBLY."

Please take this as a request to complete the priority claim.

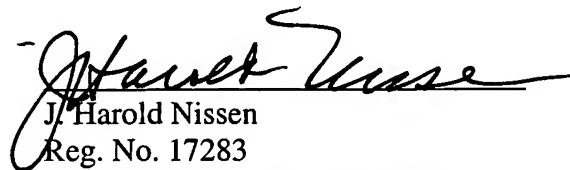
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For assistance, the Application Data Sheet previously submitted is enclosed and
our Acknowledgement Card is also enclosed.

Respectfully submitted,
LACKENBACH SIEGEL, LLP
Attorneys for Applicant(s)

By:



J. Harold Nissen

Reg. No. 17283

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Fax No.: 914-723-4301

Enclosure:

Certified Copy – South African Provisional Patent Application 2003/2302

Application Data Sheet

Acknowledgement Card

Sertifikaat

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Certificate

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Hiermee word gesertifiseer dat
This is to certify that

The documents attached hereto, are true copies of the Application
Form, Provisional Specification and Drawings of Patent Application
No. 2003/2302 filed in the name of BERNARD LIONEL GIEN on
the 25th March 2003 and entitled "DOWN THE HOLE DRILL ASSEMBLY"

**CERTIFIED COPY OF
PRIORITY DOCUMENT**

teken te
ed at
PRETORIA

in die Republiek van Suid-Afrika, hierdie
in the Republic of South Africa, this

20th dag van
day of
May 2004

A stylized, handwritten signature in black ink, appearing to read 'Shany' or similar, positioned above a dotted line.
Registrar of Patents

(To be lodged in duplicate)

PATENTS ACT, 1978

REPUBLIC OF SOUTH AFRICA

REGISTER OF PATENTS

Official application No.		Lodging date: Provisional		Acceptance date	
21	2003/2302	22	2003-03-25	47	
International classification		Lodging date: Complete		Granted date	
51		23			
Full name(s) of applicant(s)/Patentee(s):					
71	BERNARD LIONEL GIEN				
Applicants substituted:					
71					Date registered
Assignee(s):					
71					Date registered
Full name(s) of inventor(s):					
72	BERNARD LIONEL GIEN				
Priority claimed					
		Country	Number		Date
		33	31	32	
		33	31	32	
		33	31	32	
Title of invention:					
73	DOWN THE HOLE DRILL ASSEMBLY				
Address of applicant(s)/Patentee(s)					
BOTHAS, FARRELL INC., 1ST FLOOR WATERKLOOF RAND, RIGEL AVENUE, ERASMUSRAND, PRETORIA					
Address for service					
74					
Patent of addition No.					
61	Date of any change				
Fresh application based on					
Date of any change					

PATENTS ACT, 1978
APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT
[Section 30(1) - Regulation 22]
(See notes overleaf)

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The grant of a patent is hereby requested by the undermentioned applicant on the basis of the present application filed in duplicate.

Official application No.:	Applicant's or Agent's Reference:
21 01 2003/2302	STF/G224

71	Full name(s) of applicant(s) ...	BERNARD LIONEL GIEN
	(iii)	
	Address(es) of applicant(s) ...	NOS. 2 & 4 SIMBA STREET, SEBENZA, EDENVALE 1610

54	Title of Invention: DOWN THE HOLE DRILL ASSEMBLY
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(v)	The applicant claims priority as set out on the accompanying Form P.2.
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(vi)	This application is for a patent of addition to Patent Application No.:
------	---

(vii)	21 01	This application is a fresh application in terms of section 37 and based on Application No.
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(viii)	This application is accompanied by:-
X	1. A single copy of a provisional specification of 5 pages.
X	2. Drawings of 2 sheets
	3. Publication particulars and abstract (Form P.8 in duplicate).
	4. A copy of Figure _____ of the drawings (if any) for the abstract.
	5. An assignment of invention. (To follow)
	6. Certified priority document(s) (state number).
	7. Translation of the priority document(s).
	8. An assignment of priority rights.
	9. A copy of the Form P.2 and the specification of S.A. Patent Application No.
	21 01
X	10. A declaration and power of attorney on Form P.3. (To follow)
	11. Request for ante-dating on Form P.4.
	12. Request for classification on Form P.9.
	13.

(ix)	74. Address for service: BOTHA, FARRELL INC., 1 st Floor Waterkloof Rand, Rigel Avenue, Erasmusrand, 0181.
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Dated this 17th day of MARCH 2002.

[Signature]
Signature of applicant(s) or agent.
BOTHA, FARRELL INC.

The duplicate will be returned to the applicant's address for service as proof of lodging but is not valid unless endorsed with official stamp.

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Official Date Stamp
2003 03 25
Registrar of Patents
REGISTRATEUR VAN PATENTE, MODELLE, HANDELSMERKE EN OUTEURSREG

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
DECLARATION AND POWER OF ATTORNEY
(Section 30 - Regulations 8.22(i)(c) and 33)

GERHARD BOTHA & TIM FARRELL INC
PO BOX 2345 PRETORIA

FORM P3

21	01	Patent Application No	22	Lodging date	Reference
2003/2302			2003 -03- 2 5		STF/G224
71	Full name of applicant				
GIEN, BERNARD LIONEL					
72	Full name(s) of inventor				
GIEN, BERNARD LIONEL					
Earliest priority claimed		33	Country	31	Number
NOTE: The country must be indicated by its ICIREPAT Abbreviation		ZA			
54	Title of invention				
DOWN THE HOLE DRILL ASSEMBLY					

I, STEPHEN TERENCE FARRELL, hereby declare that -

- ~~I am the applicant mentioned above;~~
- I have been authorised by the applicant to make this declaration and have knowledge of the facts herein stated ~~in the capacity as Director of the applicant;~~
- ~~the inventor of the abovementioned invention is the person named above and the applicant has acquired the right to apply by virtue of an assignment from the inventor;~~
- to the best of my knowledge and belief, if a patent is granted on the application, there will be no lawful ground for the revocation of the patent.
- this is a convention application and the earliest application from which priority is claimed as set out above is the first application in a convention country in respect of the invention claimed in any of the claims; and
- the partners and qualified staff of the firm of Botha, Farrell Inc Attorneys, are authorised, jointly and severally, with powers of substitution and revocation to represent the applicant in this application as from the date of lodging thereof and to be the address for service of the applicant while the application is pending ~~and after a patent has been granted on the application.~~

SIGNED AT PRETORIA THIS 17th DAY OF MARCH 2003


STEPHEN TERENCE FARRELL
FOR: BERNARD LIONEL GIEN
SIGNATURE
(no legalization necessary)

Capacity:

If the Applicant is a Company or firm the names of the person(s) signing the form and their capacity (e.g. Director, Mandatory, Secretary, Procurist) must be stated.

If the right to apply is not by virtue of an assignment from the Inventor(s) delete "an assignment from the Inventor(s)" in paragraph 3 and give details of acquisition of right.

For non-convention applications delete paragraph 5.

This form, if it does not accompany the application, should be filed within an extensible period of 6 months from the application date.

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

PROVISIONAL SPECIFICATION

[Section 30(1) - Regulation 27]

Official application No		Lodging Date	
21	01 2003/2302	22	2003-03-25

Name(s) of Applicant(s)	
71	GIEN, BERNARD LIONEL

Full name(s) of inventor(s)	
72	GIEN, BERNARD LIONEL

Title of invention	
54	DOWN THE HOLE DRILL ASSEMBLY

DOWN-THE-HOLE DRILL ASSEMBLY

FIELD OF THE INVENTION

This invention relates to a down-the-hole drill assembly and more particularly to an assembly which eliminates the use of a foot valve tube.

BACKGROUND TO THE INVENTION

The common trend with valveless down the hole hammers is to have a drill bit with a replaceable foot valve tube protruding from the head of the bit at the striking face of the bit and piston. This foot valve tube extends into the bore of the piston and when the piston moves away from the bit the foot valve tube pulls out of the bore of the piston and exhaust from the bottom chamber takes place through the center of the foot valve tube to the atmosphere via the center bore of the bit.

While the piston is striking the bit, and the bore of the piston is engaged with the foot valve tube, the top chamber is exhausting through the bore of the piston through the center of the foot valve tube and out to the atmosphere via the bore of the bit. When the piston reciprocates away from the bit the same happens to the exhausting of the lifting chamber.

This replaceable foot valve tube has one end fixed in the body of the bit and the other end is a sliding fit into the bore of the piston. The outer diameter of the foot valve tube is limited as an increase in diameter of the foot valve tube reduces the lifting surface area of the piston. It will also weaken the walls of the piston and bit at its striking face. To increase the strength of the foot valve tube the walls have to be made thicker. This will cause a further restriction in the exhausting air of the hammer and will result in reducing the performance of the hammer. Another problem experienced is the frequent breakage of the foot valve tube. This results in down time for the driller as he has to pull the drill string out the hole, remove the bit from the hammer and replace the foot valve tube.

OBJECT OF THE INVENTION

It is an object of this invention to provide a down-the-hole drill assembly which avoids the use of a foot valve tube.

SUMMARY OF THE INVENTION

In accordance with this invention there is provided a down-the-hole drill bit assembly providing exhaust passages from the upper and lower chambers past the inner end of the bit and through the body of the bit to exit openings through the bit face.

The invention also provides for the bit to have openings extending transversely through the wall of the bit into a blind bore extending from the bit face.

Further features of this invention provide for a flushing air orifice through the closed end of the drill.

A still further feature of this invention provides a drill bit for the assembly above defined.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of this invention will become apparent from the following description of embodiments, by example only, with reference to the accompanying drawings in which

FIG.1 is a longitudinal cross section through the assembly; and
FIGS.2 and 3 show alternative forms of drill bit.

DETAILED DESCRIPTION OF THE INVENTION

As illustrated the assembly (1) provides for lifting air to the lower chamber (11) of the piston (10) via the bore (9) of the piston (10) and the exhaust via the outside of the piston (10) and also via at least part of the outside of the bit (19) body. The exhaust air is then directed via porting (18) to the inside of the bit's drill face only because it is beneficial for flushing the drill cuttings out from underneath the bit face. The function of the hammer (1) is effective due to the fact that the compressed air flows directly through the bore (9) of the piston (10) with no deviation into the lower chamber (11) and causes the piston (10) to reciprocate faster thereby releasing more energy to the bit (19).

Operatively described, the down-the-hole drill bit (1) assembly has compressed air entering the hammer at (2) in the backhead (3). The flow of the compressed air opens the check valve (4) down against its spring bias and the air flows through check valve ports (5) down the air distributor (6) and out of ports (7). Pin (8) is disengaged from bore (9) of piston (10). The air flows down the piston bore (9) to pressurize lower chamber (11). The pressure acts on surface (12) to lift the piston (10) to start its upward stroke. During the upward stroke, pin (8) enters bore (9) to shut off the airflow to chamber (11). The piston (10) continues in its upward stroke and shoulder (13) of the piston (10) passes port (14) in the inner

sleeve (15) and the expanding air in lower chamber (11) exhausts through port (14) down cutout (16) through port (17) of the inner sleeve (15), through port (18) in the shank wall of the bit (19) and through (20) to the atmosphere. The piston (10) continues traveling upward with bore (9) shut off by pin (8). Shoulder (21) of the piston (10) passes shoulder (22) of the air distributor (6) and air flows from ports (7) via the bore (9) of the piston (10) into upper chamber (24). The pressure in chamber (24) now acts on surface area (25) and (26) to cause the piston (10) to travel downward towards the bit (19). During the piston's downward travel step (27) on the piston (10) passes cutout (28) in the bore of the wear sleeve (29) and the expanding air from chamber (24) exhausts down cutouts (30) on the piston (10) down through passage (31) through port (14) in the inner sleeve (15) down cutout (16) through ports (17) then (18) in the bit (19) and through (20) to the atmosphere.

When the bit (19) is lifted away from the rock face, the bit (19) will drop forward to be stopped by the bit retaining rings (33). The piston (10) will follow the bit (19) and ports (7) will be exposed to upper chamber (24). Air pressure acting on surfaces (25) and (26) exerts more force than the pressure acting on surface area (12) in lower chamber (11). The piston (10) will therefore remain inoperative. The airflow from upper chamber (24) follows the exhaust path down (30), (31) through port (14) down (16) and through (17), (18) and (20) to the atmosphere. Pressure in lower chamber (11) is released via cutout (34) on the bit head (19), through (18) and (20) to the atmosphere.

The assembly is robust and provides satisfactory operating surfaces on the piston and bit both for air pressure and striking force.

Fig. 2 shows an enlarged view of a bit wherein the passage (20A) is formed by drilling from the inner end of the bit and subsequently fitting a plug (35) to close the opening at the inner end of the bit (19). The lateral opening (18) is elongate

to provide easy flow of exhaust air from the assembly to flush the outer operative end of the bit (19).

Where desired the plug (35) can have an additional flushing air flow path (36) and may be made to be interchangeable with a solid plug.

Fig 3 shows a drill bit (37) which has no axial exhaust passage but where such passage is provided at (38) in the outer part of the bit (37). These passages (38) feed into passages (39) which extend through the face of the bit (37) to the atmosphere.

It will be appreciated that the exhaust air flow passages can take several different configurations. All of these will permit the foot valve tube to be dispensed with providing concomitant advantages to the assembly.

DATED THIS 14th DAY OF MARCH

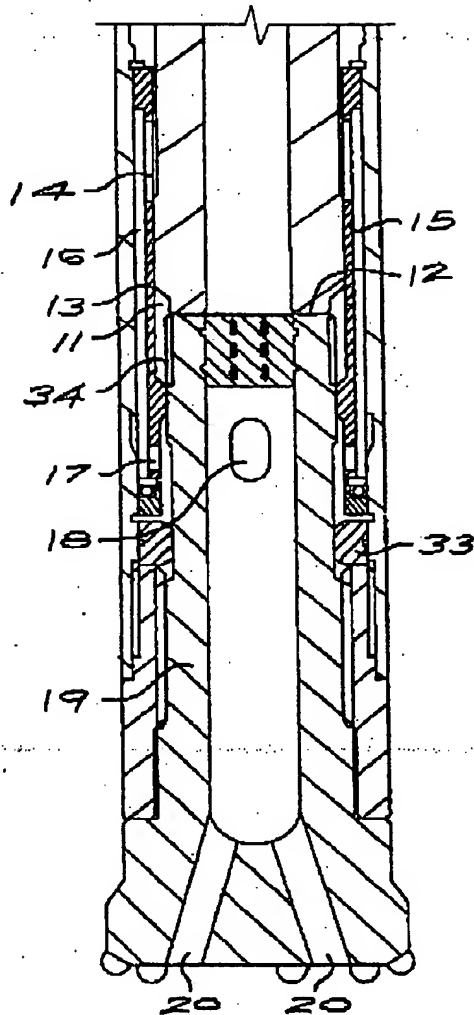
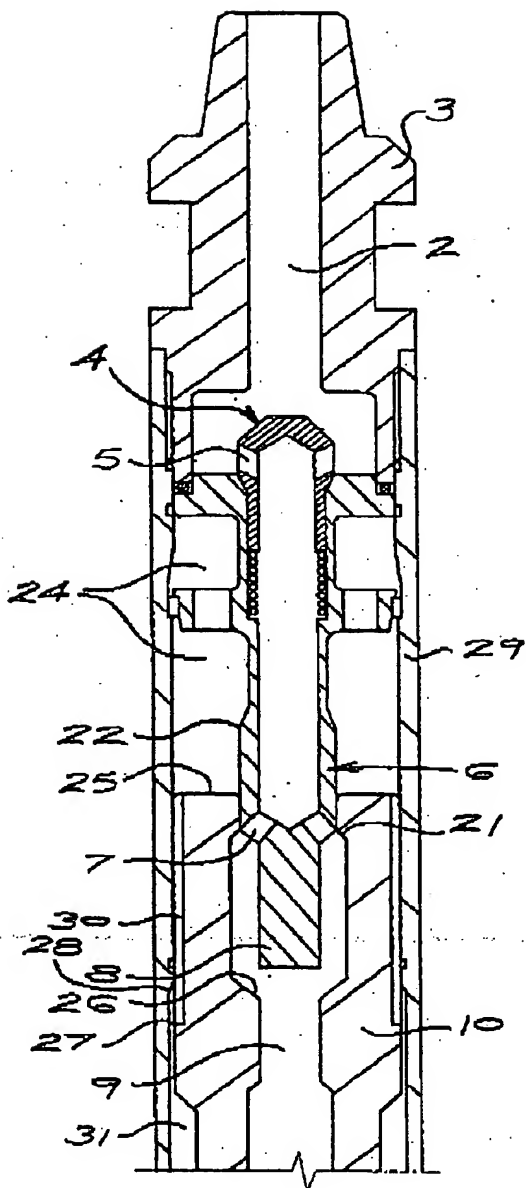
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FOR THE APPLICANT

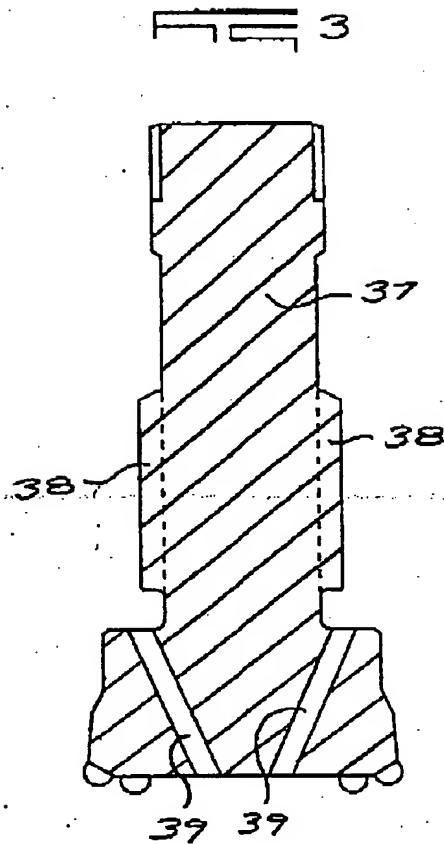
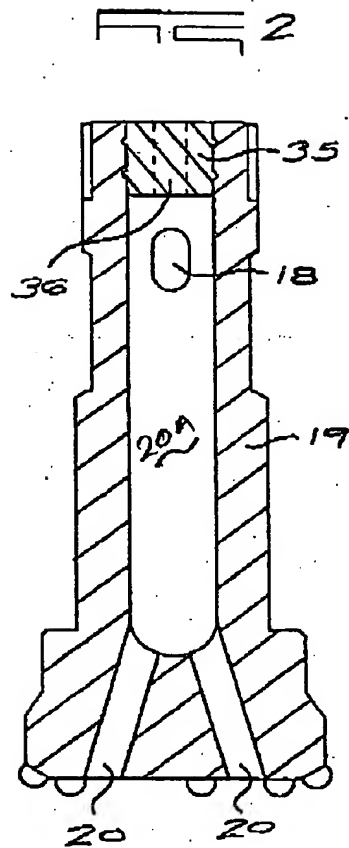
BOTHA, FARRELL INC
1st FLOOR, WATERKLOOFRAND
RIGEL AVENUE, ERASMUSRAND
PRETORIA

FIG 1



BOTHA, FARRELL INC
FOR THE APPLICANT

BOTHA, FARRELL INC
1st FLOOR, WATERKLOOFRAND
RIGEL AVENUE
ERASMUSRAND, PRETORIA



Quas

FOR THE APPLICANT
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 RIGEL AVENUE
 ERASMUSRAND, PRETORIA